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Utica Water Works.

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HOPPER.



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THE UTICA WATER WORKS.

A PAPER READ BEFORE THE

ONEIDA HISTORICAL SOCIETY,

JANUARY, 1886,

BY

THOMAS HOPPER.



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THE UTICA WATER WORKS.

BY THOMAS HOPPER,

President, Projector and Builder of the Works.

At an early period in the history of the village of Utica, the subject of procuring a more wholesome supply of water, than could be obtained from wells, was under the earnest consideration of the five hundred pioneers who had made their new homes near the banks of the Mohawk river, within a radius of a few rods of Bagg's Square.

On the 13th day of April, 1802, the Legislature of the State passed an Act, creating Benjamin Walker, Silas Clark and Robert Bardwell and their associates a body politic, for the purpose of supplying the village of Utica with wholesome water, by means of aqueduct, under the name of the Utica Aqueduct Company; capital, not to exceed five thousand dollars. In pursuance of this Act, the company by means of a log aqueduct, brought water from springs at the foot of the sand bank (now Spring street), where the waters of the several springs were united and taken down through the pasture lots to a point, now, the north corner of Genesee and Liberty streets; and from thence down Genesee street, at a distance of about 18 feet from the north line thereof. Some of the logs are still well preserved, and lying at a depth of nine feet from the surface of the street. This aqueduct continued to supply a part of the inhabitants of the village, until 1824; when the Erie canal was made through Utica, at which time the aqueduct was severed and the supply below cut off. As an auxiliary to these works, and for the better protection of property against fire, in 1805 the trustees of the village ordered three wells to be dug, and fitted with pumps—they were severally placed at the intersection of Hotel with Whitesboro streets, at the corner of Genesee and Liberty streets, and in the center of Genesee street in a line from the west corner of John and Main streets, and the north corner of Genesee and Whitesboro streets. The pump was removed from the last mentioned well about 1822, and a flat stone placed over it perhaps

three feet from the surface of the street. The two other wells were filled up at an earlier period of time. From 1824 to 1834 the inhabitants of the village and city were dependent entirely upon their wells for water.

In 1826, (13th day of April), the Legislature passed an Act incorporating another company of the same name for supplying the village of Utica with water, "The Utica Aqueduct Company, in the County of Oneida." The incorporators were Newell Smith, William Alverson, David P. Hoyt, and their associates. The works contemplated in this Act were not erected.

In 1832, an association was formed; the Articles of Association dated April 3d, 1832. The property of this association was divided into eight shares: three belonged to Apollos Cooper, one to James Sayre, one to Ephraim Hart, one to Dr. T. Pomeroy, one to Julius Spencer, and one to Palmer Townsend. The certificates were drawn in form as follows, to wit:

"Utica Water Works Association, between Apollos Cooper and others, as per deed and articles of association, dated 3d of April, 1832. No. 1. It is hereby certified that Apollos Cooper is proprietor and owner of the Three Shares of the property of the said Association, each share being the eighth part of the whole of said property. Transferable only by the consent of the share or stockholders of said association, as specified in said Articles of Association.

In testimony whereof, the President and Secretary have hereunto set their names, the first day of September, 1833.

(Signed,)

JAMES SAYRE, *Sec'y.*

A. COOPER, *PRES'T.*"

This association did not proceed to erect their works until 1834. They then connected the spring on Mr. Middleton's lot above Spring street to a spring north of said street, and from thence laid 2½ inch pipe down through Cornelia street to Fayette street, and from thence down Fayette street, crossing Genesee street to corner of Bleeker street, thence down Genesee street to Catharine street, and from thence to the Greenman building, where it ended. This association served very pure water until 1850, when the works were abandoned.

The Legislature passed an Act May 10th, 1845, to authorize Edward Brodhead (then a citizen of Utica) to supply the city of Utica with pure and wholesome water. Mr. Brodhead made a survey and plans for introducing pure water into the city through

a log aqueduct of six inches bore, from the Starch Factory Creek, on that portion of it on which the large impounding reservoir is located; but not meeting with sufficient encouragement he abandoned the project. He is now an honored citizen of Milwaukee, Wisconsin.

UTICA WATER WORKS COMPANY.

INCORPORATED MARCH 31, 1848.

Directors named in the Act: James Watson Williams, Nicholas Devereux, Alfred Munson, Andrew S. Pond, Charles A. Mann, Horatio Seymour, Silas D. Childs, Willard Crafts and Thomas Hopper. [Of these, two are living; Horatio Seymour and Thomas Hopper.] Capital stock, \$75,000.

The subscribers were as follows:

NAMES.	SHARES.	AMOUNT.
James Watson Williams,.....	45	\$1,200 00
Alfred Munson,.....	100	2,500 00
Charles A. Mann,.....	100	2,500 00
Horatio Seymour,.....	80	2,000 00
Silas D. Childs,.....	100	2,500 00
Willard Crafts,.....	40	1,000 00
Nicholas Devereux,	60	1,500 00
Thomas H. Hubbard,.....	40	1,000 00
Philo Gridley,.....	40	1,000 00
James Benton,.....	4	100 00
John McCall,.....	20	500 00
Michael McQuade,.....	4	100 00
Julius A. Spencer,	10	250 00
Hugh Crocker,	2	50 00
T. E. & A. A. Jones,.....	8	200 00
J. V. P. Gardner,.....	10	250 00
Patrick Cassidy,.....	4	100 00
Robert Jones & Son,.....	2	50 00
John F. Seymour,.....	20	500 00
James Dutton,.....	2	50 00
Harvey Barnard,.....	2	50 00
O. B. Matteson.....	40	1,000 00
J. E. Warner & Co.,.....	10	250 00
Charles P. Kirkland,.....	40	1,000 00
Edmund A. Wetmore,.....	20	500 00
Baxter & Hull,.....	12	300 00

NAMES.	SHARES.	AMOUNT.
Price & Dana,.....	4	100 00
R. W. Sherman,.....	2	50 00
Theodore P. Ballou,.....	4	100 00
Alvin White,.....	4	100 00
Timothy O. Grannis,.....	2	50 00
William Bristol,.....	32	800 00
Pomeroy, Walker & Co.,.....	20	500 00
Alfred Churchill,.....	40	1,000 00
George Tracy,.....	4	100 00
John S. Peckham,.....	2	50 00
James Bidwell,.....	2	50 00
Stephen Thorn,.....	20	500 00
James Bryan,.....	4	100 00
Moses D. Bagg,	10	250 00
William J. Bacon,.....	10	250 00
Simon V. Oley,.....	10	250 00
Murdock & Andrews,.....	16	400 00
Levi Cozzens,	20	500 00
Alfred L. Wells,.....	10	250 00
Charles Churchill,.....	4	100 00
Martin Hart,.....	40	1,000 00
E. B. Langford,.....	1	25 00
James Klinefelt,.....	4	100 00
N. White & Sons,.....	2	50 00
N. H. Morse,.....	1	25 00
J. C. Bailey,.....	12	300 00
Thorn & Maynard,.....	40	1,000 00
James Lewis,.....	4	100 00
James Mapes,	4	100 00
Orville Orcutt,	4	100 00
Archibald Gardner,	4	100 00
McQuade & Clark,.....	8	200 00
Chauncey Palmer,.....	8	200 00
Theodore S. Faxton,.....	100	2,500 00
David Donaldson,.....	4	100 00
Sylvester Aylesworth,.....	1	25 00
Benjamin F. Brooks.	1	25 00
Eaton J. Richardson,.....	4	100 00
Charles Hurlburt,.....	4	100 00
D. H. Davidson,.....	4	100 00
E. S. Brayton,.....	4	100 00

NAMES.	SHARES.	AMOUNT.
J. L. Pierce,.....	2	50 00
D. V. W. Golden,.....	1	25 00
James Dana,.....	4	100 00
Z. & P. Lyon,.....	2	50 00
M. M. Ellis,.....	2	50 00
M. M. Bagg,.....	1	25 00
Bradford S. Merrell,.....	2	50 00
Bailey & Brothers,.....	1	25 00
William Tracy,.....	8	200 00
Peter Freeman,.....	6	150 00
William Freeman,.....	1	25 00
John Miller,.....	4	100 00
William Brady,.....	2	50 00
Roberts, Sherman & Colston,...	4	100 00
Gilbert A. Foster,.....	10	250 00
Richard Jackson,.....	2	50 00
A. J. Williams,.....	16	400 00
Thomas T. Williams,.....	1	25 00
D. Timmerman,.....	1	25 00
John W. Bates,.....	4	100 00
W. H. Haynes,.....	1	25 00
Lawrence Morgan,.....	4	100 00
Joseph Bedbury,.....	1	25 00
Joseph Nutt,.....	1	25 00
Paul Keiser,.....	2	50 00
M. M. Ellis,.....	4	100 00
Isaac Bond,.....	4	100 00
William D. Hamlin,.....	10	250 00
Egbert Bagg,.....	4	100 00
E. M. Gilbert,.....	20	500 00
T. R. Walker,.....	20	500 00
J. Griffiths,.....	6	150 00
Urbane Dunning,.....	1	25 00
Norman C. Newell,.....	4	100 00
Herman Ferry,.....	8	200 00
Job S. Collins,.....	2	50 00
William Walcott,.....	40	1,000 00
John J. Francis,.....	4	100 00
Peter Clogher,.....	2	50 00
Luke Wilkins,.....	4	100 00
William Morris,.....	20	500 00

NAMES.	SHARES.	AMOUNT.
Ebenezer Leach,.....	20	500 00
Martin Bremmer,.....	8	200 00
Edward Eames,.....	4	100 00
John Carton,.....	3	75 00
James H. Reed,.....	6	150 00
Palmer V. Kellogg,.....	8	200 00
George Parker, Clinton,.....	10	250 00
Edward B. Jones,.....	2	50 00
Warnick & Bryan,.....	8	200 00
H. H. Smith,	2	50 00
Charles Downer & Co.,.....	4	100 00
Griffith Williams,.....	1	25 00
M. B. Debman,	1	25 00
Pomeroy & Crippen,.....	2	50 00
A. N. Pomeroy,.....	2	50 00
J. O. Jones,.....	4	100 00
Warren Cooley,.....	1	25 00
Clark Wilson,.....	8	200 00
Edward Seaton,.....	1	25 00
Timothy O. Grannis,	4	100 00
John Beston,.....	20	500 00
Isaac Fish,	1	25 00
Onias P. Miller, Whitestown,...	20	500 00
Thomas Hopper,.....	4,048	36,250 00

Of these subscribers twenty-six are now living.

The projector of the proposed works submitted the plans, diagrams and specifications in the autumn of 1847, to a meeting of citizens held in Mechanics Hall. Approval was very general for some means being adopted, by which the City might be supplied with pure water, but none favored the works being made by the City in its corporate capacity, and therefore they must be established by individual enterprise, if at all. Seventy-five thousand dollars at that time was a large amount to raise, and for a work for which very grave doubts existed in the minds of many. Some thought it a very wild project, and of doubtful utility; others "had no money to throw away;" and many were of the opinion that the cost had been very much underestimated, and that we were launching ourselves into loss and failure. The directors were of the opinion that a trial had better be made; a subscription book was opened, and presented to the citizens pretty generally

for several months, with the result of \$22,000 being subscribed, and there seemed but little prospect of obtaining a much greater sum. At this juncture so many obstacles were presented, that all hope of success was lost, and would have been to this day, probably, but for the energy and perseverance of two of the directors, (Messrs. Wetmore and Devereux.) These gentlemen were unwilling to give up an enterprise so very essential to the welfare of the City, without resorting to the last means for its accomplishment; and they again had an interview with the projector of the works, proposing ways by which the needed capital might be obtained, provided a person could be found to erect the works for a specific sum, and assume the risks of the purchase of land and water privileges, &c.; all to be in accordance with the plans, specifications, &c. They said "they had been diligent in finding such person, but none would think of engaging for a less sum than \$150,000, which sum could not possibly be obtained." "They feared the estimate was quite too low;" though they were reassured that the plans and estimates were carefully made, so far as at present could be ascertained. The owners of the land and water privileges to be acquired had been conferred with; some were willing to sell at reasonable prices, but the prices of others could not be favorably entertained. There were about ten miles of these rights to be obtained, which would require many months to perfect titles to, and if the works were to be commenced without delay, the contractor—whoever he might be—would have to assume the risk of getting titles. The result of this interview was a negative answer to the requests then made, but with a promise to meet again soon after further consideration. The next meeting was at Mr. Wetmore's office. The whole matter had been under careful advisement; \$53,000 were yet needed, (\$22,000 had already been subscribed.) It was the opinion of the directors that the subscribers would prefer to double their amounts of subscriptions to having the enterprise fail of success, and that by canvassing the city thoroughly the remainder might be secured. A few accessions were made, but the prospects were so discouraging, that the matter remained *in statu quo* for some time. In the meantime the originator of the enterprise visited some friends in New York. Fortunately those friends evinced greater confidence in the project than was felt at home, which made it certain that the necessary funds would be forthcoming when wanted; this led to another meeting of the directors, when one of their number submitted a proposition to not only enter into the contract to perform all the

requirements of the plans, specifications, &c., to the full and entire satisfaction of the directors, but would furnish one-half of \$75,000. The offer was gladly accepted, when the required sum was at once raised. The contract was entered into on the 21st day of April, 1849.

The plans and specifications required a well to be made in the west branch of the Starch Factory Creek, on Mr. Harvey's farm, with all necessary grates, strainers, &c. A round aqueduct of twelve inches internal diameter, to be constructed of hard burned brick laid in cement, excepting in places subjected to pressure, where ten inch iron pipe was to be laid. Said aqueduct to extend from said well to between High and Chatham streets, where a reservoir was to be built, to be two hundred feet on each street, and two hundred and forty feet in width, and for a depth of ten feet of water; with all necessary wells, pipes, &c. The reservoir to be substantially fenced. The aqueduct to be continued through the reservoir to near its north corner to a twelve inch iron gate; from thence a twelve inch cast iron pipe to centre of Bridge street (now Park avenue,) and from thence a ten inch pipe to the west side of Genesee street (through Dakin street), and from thence an eight inch pipe along west side of Genesee street to Hotel street; thence down Hotel street to Liberty street, and from thence a pipe of six inches bore through Liberty to Genesee street, down west side of Genesee to Catharine street; and from thence across to east side of Genesee street; and from thence down to Main street. A pipe of six inches bore down Bridge street from Dakin street to centre of Chancellor square, and from thence a four inch pipe to Jay street. From these mains the branch pipes to be laid as follows:

Genesee street,....	Dakin to Bleecker,....	3 inch pipe.
Genesee street,....	Catharine to Water,...	4 inch pipe.
Columbia street, ..	Genesee to Varick,.....	5 inch pipe.
Fayette street,....	Genesee to State,.....	4 inch pipe.
Hotel street,.....	Liberty to Whitesboro,	4 inch pipe.
Whitesboro street,	Genesee to Seneca,.....	3 inch pipe.
Charlotte street,..	Bridge to Bleecker,....	4 inch pipe.
John street,.....	Bridge to Bleecker,....	3 inch pipe.
Bleecker street,...	Franklin to 6 Bleecker,.	3 inch pipe.
Elizabeth street,..	Bridge to Kent,.....	3 inch pipe.
Kent street,.....	Elizabeth 150 ft. down,.	3 inch pipe.

Franklin street,... Bleecker 400 ft. down,. 3 inch pipe.

Catharine street,.. Genesee to First,..... 3 inch pipe.

Broad street,..... Genesee to Second,.... 3 inch pipe.

Branch pipes to be laid at all intersecting streets. Stop cocks to be set for each of the branch pipes, and other stop cocks to be set as directed. Pipes to be laid for fifty hydrants.

All cast iron pipes to be subjected to three hundred pounds pressure; and the contract, &c., further required that the contractor shall, at his own expense and cost, get and procure to the Water Company, a good and valid right and title to take, use and protect against injuries or nuisances, all the waters flowing from springs or otherwise, into either branch of the Starch Factory Creek, south of the well at Harvey's farm; and also the right to make, lay and construct and repair aqueducts, reservoirs, pipes and other works necessary or proper in the conveying and distribution of the water, according to the design and intention of the contract. The contractor to pay all expenses, costs and damages of every kind and nature, which may be incurred by reason of taking land and water. The evidences to be recorded in the office of the Clerk of Oneida County. The contractor agreeing to construct the works, and every portion thereof, in the most permanent and substantial manner, and at his own expense and cost, furnish all the materials, labor, and other things, for the construction of said works; and have the whole completed and entirely finished by the first day of May, 1850.

In short, the contractor was bound to construct, complete and put the works in full working order, and to keep them in repair for three months after completion; and to warrant all the works and pipes to stand without any failure for one year from the time of completion; also to superintend the works for three months after completion. The superintendence has extended to the more remote period of thirty-five years.

The work on the reservoir was commenced the day after signing the contract; the laying of pipes on the 8th day of May following. As it was the intention to finish the works in course of the year, the construction was pressed with much energy and perseverance. The summer proved very favorable—not a day was lost on account of inclement weather. On the 8th day of November, 1849, the water was let into all the mains, and was flowing from all the hydrants and the works virtually finished, to the full satisfaction of parties contracting.

An Act passed the Legislature March 8, 1850, authorizing the Company, from time to time, to increase their capital stock, in such sums as the directors may deem best, so however that the whole amount, including the present stock, shall not exceed \$150,000.

June 30, 1853, the Legislature passed an Act as follows: "The Utica Water Works Company is hereby authorized, by an extension of its pipes and conduits, to supply water to such towns or parts of towns, adjoining the bounds of the City of Utica, as said Company may deem it expedient to supply with water."

This same year a four inch main was laid from the termination of the six inch main, at the corner of Genesee and Main streets, down to the river, running twelve feet from the west wing of the bridge; thence across the river (conforming with its bed) to Deerfield, passing three feet from the north wing of the bridge, and from thence northeasterly through the street, to opposite Shaw's slaughter house, and from thence into the slaughter house yard.

In 1853 also the company increased its capital to \$85,000. The \$10,000 was raised principally for the laying four inch mains from the junction of Varick and Columbia streets to the Steam Woolen Mills on Columbia street, and to the Globe Woolen Mills on Court street.

In the fall of 1856, the Company bought the lot on the south corner of Steuben and South streets, for the purpose of boring for water. Richard R. Lansing and others, in 1828, commenced boring for coal on this lot, and run a three inch shaft down about two hundred feet. After the first ten feet (of earth) the boring was through Utica slate. The work was abandoned, and the hole remained plugged until 1836, when George J. Hopper with others resumed the boring and continued on for several weeks; but meeting with no better success, and coming to nothing but slate, again plugged the drill, until the purchase by the Water Company in 1856. An inclosed derrick was erected over the shaft, of thirty-five feet in height; four hundred feet of iron rods were prepared, with all other apparatus for drilling. A spring pole was set, windlass, ropes, &c., in place, and the work of sinking the shaft continued until the cold weather of November, when the boring was ended, purposing to go on again in the spring, but which however was not attempted. The shaft was sunk to a depth of about three hundred and fifty feet. The drill came to nothing but hard slate, until three hundred and forty-five feet down. Here the boring was through black sandstone for about two feet; from this there

came a flow of oil and gas. The gas, when ignited, burned brilliantly from the cylinder in which the debris was raised, until its final escape. Oil was fully apparent. The drill again passed into slate. In corroboration of this statement, Mr. Sweet (then State Engineer), who had visited the oil regions in Pennsylvania in 1849, under the auspices of this State, to make examinations and ascertain the status of that interesting region, came from Albany twice, and on careful examination of the debris drawn from the well, said he "had never met with a more encouraging 'show' for a flow of oil at the same depth of boring;" and was of the opinion, at an increased depth of eighty feet, oil-bearing sandstone would be reached of much greater thickness and perchance a large flow. Further investigation may lead to ulterior results of interest and profit, although well known geological formations do not favor a great outlay in pursuance of finding oil or natural gas in this locality. "Finding," however, is generally the result of search, and particularly so, if searching into the unseen and hidden recesses of the depths below.

In 1854, the directors finding the supply of water (being 800,000 gallons per day from the springs) becoming inadequate for the increasing demand purchased a farm of about forty acres of land, lying southerly of George W. Harvey's farm, from Robert Cook, on which was erected the second reservoir. The bank was made to the height of fifty feet. The water at high water mark covers an area of seven acres; capacity about forty million gallons. This reservoir answered its purpose until 1868, when it was found necessary to make another to meet the constantly increasing demands. Consequently the Company purchased seventeen acres of land, on which the distributing reservoir is built, and at the same time it became necessary to increase the aqueduct capacity from ten inches internal diameter, to two aqueducts of twelve inches each; which, together with distributing pipes through the streets of the city, would give an increased distance of cast iron pipes of about ten miles.

The estimated cost of this new work (which was the actual cost) was \$130,000. Whereupon in May (18th), 1868, by an Act of the Legislature, the Common Council of the City of Utica was authorized to make a contract with the Utica Water Works Company, and thereby fix and agree upon a sum to be paid annually to the Company, for a supply of water for the extinguishment of fires; and providing that when such contract is made, the Company shall furnish water to the City in the manner required by the

law. The Company was authorized by the same law, to increase the capital stock to a sum not exceeding \$200,000, to be fixed by the directors. A contract was made between the City and the Company, under the law; and the directors resolved to increase the capital stock to \$200,000, being an addition of \$115,000 to the former capital of \$85,000. The balance of \$15,000 required for the work was raised by the sale of the bonds of the Company. Confidence at this time was so fully established in the ability of the Company to fulfil any obligations it might deem proper to assume, that no difficulty was encountered in the sale of stock and bonds; but some delay occurred in endeavoring to contract the work. The directors were not willing to assume the responsibilities unless a contract could be made with a responsible party to do the work. No one offered, and there seemed no alternative, but for the former contractor to assume its responsibilities. The contract was entered into, the contractor engaging to put up the whole works, in full accordance and requirement of the plans, specifications, and contract, for the sum of \$130,000, and to fully complete the same within one year; all of which was performed to the full satisfaction of the directors and of the Common Council.

This gave about forty million gallons more storage capacity, and eighty feet greater head to the water to the city, or a difference of thirty-five pounds additional pressure to an inch. The reservoir on High street was at this time sold and filled up by the purchaser.

In pursuance of the heretofore mentioned Act of the Legislature, passed May 18th, 1868, the City of Utica entered into a contract with the Utica Water Works Company as follows, viz.: the said Company agreed to furnish water for the said City, for the extinguishment of fires, and to lay and extend its pipes and conduits in the streets designated upon a map and plan presented to the Common Council of said City, by a committee of directors of said Company, on the 20th day of April, 1868, duplicate of which is on file in the office of the City Clerk, and is certified to by Theodore S. Sayre, on behalf of the City Committee, as the map and plan here referred to, and to provide suitable reservoirs to constantly supply said City with sufficient water for the extinguishment of fires: provided said City shall pay therefor the consideration hereinafter mentioned; and also upon the condition that the said Company shall be able, on or before the 15th day of November, 1868, by the sale of stock or otherwise, to raise sufficient money to complete the works contemplated by this contract.

And said City agrees that when the said Company shall have furnished by the said reservoir, and by the pipes and conduits a supply of water in manner and for purposes aforesaid, and so long as they shall continue to supply sufficient water for said purposes, it will pay therefor to the said Company the sum of ten thousand dollars, annually, on the 15th day of November of each and every year, and will also pay one-half of said taxes assessed upon the Company, within the limits of said City, and taxed therein, in excess of \$1,000.

If said City shall determine to have said water pipes extended on any street beyond the point designated on said map, the said Company agrees to extend the same to such point as may be designated; the said City agreeing to pay in addition to the sum herein specified, seven per cent upon the cost of said extension, or new work, annually.

The Company agrees that the City may obtain a supply of water for the City Hall and other public buildings, owned or occupied for municipal purposes, without payment of water rents, but subject in other respects to the rules of the Company. The City is to furnish all the hydrants, the Company to put in and connect the same with the pipes; the City agreeing to pay all expenses therefor, excepting the pipes connecting the hydrants with the mains. The Company agrees to erect six fountains and supply them with water, the City to pay the expense thereof.

This much needed and timely accession to the Company's works placed it on a basis most satisfactory to the directors and to the citizens generally. For the present the supply was abundant, and it was hoped would continue so for at least five years to come; but the rapid growth of the City, and consequent demand, again warned the directors that it would be prudent to prepare for larger storage capacity at an early day.

By an Act passed April 7th, 1870, the Utica Water Works Company was authorized to increase its capital stock to a sum not exceeding \$400,000, to be fixed from time to time by directors of said Company.

Prior to 1872 one of the directors visited Cedar Lake several times in reference to the possibility of bringing its waters to the reservoirs for City purposes. In the fall of that year the services of Hiram Park were engaged to make surveys and estimates of the quantity of water that could be obtained, and the probable cost of an aqueduct to the distributing reservoir, a distance of ten miles. Mr. Park found the pond to have an area of twenty-two

acres, and estimated the cost of such an undertaking, to its completion, to be \$220,000, which was a much larger expense than contemplated, and decided to be unworthy of further consideration. Mr. Park was requested to make a preliminary survey of the Starch Factory Creek. This being done, plans, specifications and estimates were prepared, for the erection of the large impounding reservoir. In the spring of 1873, the services of an engineer was secured to carry through and to take principal supervision of the work; he remained in this position a short time and resigned, not being willing to continue in the responsibilities of so hazardous an undertaking; whereupon the duties fell upon the director who had erected the former works. Since large quantities of material were ordered, and arriving on the ground, and the work in full progress, it was continued until July, when a "strike" was imminent; and as the bank could not be so far completed as to secure it against destruction by the spring floods, the men were dismissed; nor was the work resumed till the spring following, when four hundred men and eighty teams were engaged, and the work hardly pressed until the frosts of winter came upon us, when the bank was to be raised fully ten or twelve feet to be secure. The wheelbarrow men and shovelers were kept at work all winter, but as this would not give the desired security to the banks, it was finally resolved to make a flume through the south end of the bank, twelve feet deep and six feet wide, with two gates, each three by six feet. This, together with twenty inch waste pipe through the bottom of the bank, safely discharged the waters of the spring floods, and the reservoir was finished the following year. This reservoir is three-quarters of a mile in length, with an area of about thirty acres, and a capacity of holding about three hundred million gallons of water. The bank has three hundred feet base, twenty feet across the top, and is seventy feet in height. The cast iron mains connecting this reservoir with the distributing reservoir are twenty inch to East street, the rest of twelve inch internal diameter. The entire cost was \$157,000, which sum was provided for by increase of the capital stock of the Company \$100,000, and the remainder by issue of its bonds, \$57,000. The works heretofore mentioned have given ample supply of water for the uses of the City to this time; and to be fully prepared for all emergencies, the directors resolve to advance with the constant progress of the City, and enlarge and extend the works commensurate with all demands.

In the summer of 1885, titles were fully perfected to the basin lands lying southerly of the south bounds of the distributing

reservoir, and the northerly bound of "Sylvan Glen," containing an area of eighty-one acres. This site for the new reservoir embraces advantages seldom to be obtained at any price. Its supply of water will be from the westerly terminus of the Company's water shed, as it emerges from the deep, rocky forest glen above mentioned.

The full extent of the water shed covers an area of fifteen square miles, and taking in the full northerly slope of the hills lying south and southeasterly of the city. These hills in a distance of twelve miles culminate in twelve hundred feet elevation, sending their waters down through a thousand little rivulets, to the four rocky chasms, from whence they are received, uncontaminated by morass or swamp, into the reservoirs below, ready to be drawn at all times, and under various pressure, by the use of the gates connecting the reservoirs. The waters of this district have not been stored heretofore but in a very limited extent, and are soft and nearly free from lime, which renders them valuable for manufacturing purposes.

In Oneida county the rainfall averages forty inches annually—equal to a volume of 1,858,560,000 gallons. Deduct one-third for evaporation, percolation, &c., &c., and there remains 1,239,040,000, available for domestic purposes. On completion of the new reservoir the storage capacity of the four reservoirs will be 800,000,000 gallons. Add to this 439,040,000 gallons for replenishing the quantity drawn in course of the year, and we have the sum total of available rainfall, as above stated: equal to three million four hundred and fifty thousand gallons per day, or thirty-four gallons per capita for a population of one hundred thousand; and in addition the never-varying subterranean flow at Græfenberg of five hundred thousand gallons per day. Other reservoirs will be made from time to time as may be required.

The works in progress of construction were commenced about the first of September, 1885, under the direction of the President of the Company. The work of laying the twenty-four inch pipes from the south side of the distributing reservoir began the first of September; from thence it extended down through J. W. Miller's farm to the center of James and Mohawk streets; thence westerly through James street to Brinckerhoff avenue to Square street; thence westerly in Square street to Johnson square and West street, a distance of 7,150 feet. From twenty inch valve twenty inch main extend northerly in West street to Rutger street; thence westerly to Hopper street, to Union; down Union

to Blandina, to Genesee; down Genesee, turning through Hotel street, under the canal, to Liberty street; thence to Genesee street, and down Genesee to Whitesboro street; a distance of 6,600 feet. Finished in December, 1885.

The plans further contemplate the laying of a twenty inch main from the twenty inch gate (set for the purpose) from Johnson square, through Hobart street to Genesee; thence to Noyes street, and through Noyes street to Stark street; a distance of 4,500 feet.

In addition to the large mains, about two-and-a-half miles of smaller mains were laid, varying from four to ten inches calibre; and about the same quantity will be laid next year.

Work was commenced on the new reservoir simultaneously with the laying of pipe, and was pushed to the full extent desirable in weather so unpropitious as that of last autumn. This reservoir, when completed, will hold about five hundred million gallons of water. Its bank will be two thousand feet in length, and will have sixty feet elevation from the base line of the reservoir; the sectional lines two hundred and sixty feet at base, slopes of bank one to two, and twenty feet between angles at top. The whole will be constructed of earth, to be taken from the interior of the reservoir, which is abundant and of the very best quality. The bank will only be built this year to a height of forty-five feet, and may be ready for partial filling in July. In connection with this work the distributing reservoir will be enlarged in extent of about two and one-half acres, and deepened sufficiently to give it nearly double its present capacity. These new works will require an outlay of \$200,000.

The supply of water to the City is by gravity flow, which is the most economical, reliable and efficient of any system yet adopted. The reservoirs are so connected with conduits that water may be let on for City supply from either, or all, as occasion may require. The usual direct flow, however, is from the distributing reservoir, the surface of which is two hundred feet elevation above the datum line of the City. This gives a pressure of eighty-seven pounds to a square inch, and a flow from the hydrant at Bagg's square of about eighty feet altitude. If in case of a large conflagration a higher flow should be desirable, the gate from the said reservoir would be closed, and the gate to the new reservoir opened, which would give a pressure of one hundred and thirteen pounds to an inch. By closing both these gates and opening the gate at the Starch Factory Creek reservoir the pressure would be raised to one hundred and thirty pounds to a square inch. The

fourth reservoir would give a pressure of two hundred and seventy pounds to an inch, which is beyond the strength of any Water Company's Works to bear. The capital stock of the Company was increased last year to the sum of \$400,000.

At the close of this year the aggregate length of the Company's cast iron mains will not vary much from forty-five miles.

The purchase of buildings Nos. 234 and 236 Genesee street, for an office, is the last act worthy of mention.

Officers of the Water Works Company, 1885-1886.

THOMAS HOPPER, *President.*

A. G. BROWER, *Vice President.*

P. V. ROGERS, *Treasurer.*

J. K. CHAMBERLAYNE, *Secretary.*

Board of Directors.

ABRAM G. BROWER,

PUBLIUS V. ROGERS,

CHARLES A. BUTLER,

WILLIAM KERNAN,

C. G. CHURCHILL,

THEODORE S. SAYRE,

HENRY J. WOOD,

THOMAS HOPPER,

J. K. CHAMBERLAYNE.

Since the above account of the Utica Water Works was written it might be interesting to add—that at the present date, October 11th, 1886, the works contemplated are now nearly completed. The banks of the new reservoir are raised to a height of forty-seven feet, on the summit of which a driveway is formed thirty feet in width, from which is revealed many extended landscapes of great beauty and interest. Work was commenced about the first of May with as large a force of men and teams as could be advantageously engaged, and from time to time were increased as needed, generally numbering eighty teams and two hundred and seventy men. The material from which the bank has been entirely made is of the best kind and in great abundance, and enough yet remains for the sixty feet bank, when the time comes for its construction. The area of this reservoir has been extended easterly forty feet, and the depth lowered on an average of about eight feet, thus increasing its capacity to about 400,000,000 of gallons, and when the sixty feet bank shall have been completed it will be

able to store perhaps 600,000,000 gallons. In course of constructing the works, the area of the distributing reservoir was enlarged from eleven to fourteen acres, with an added depth from three to twelve feet, thus nearly doubling its previous capacity. The banks also have been improved by raising the same to a uniform height, widened likewise, and the inner slopes substantially paved. As the rivulets formerly flowing into this reservoir are now all cut off, and their waters empty into the new reservoir, the distributing reservoir receives its supply entirely from the other reservoirs through iron pipes laid for that purpose; the ingress and egress being governed entirely by gates, and at the option of the attendant, water can be drawn from either or all the other reservoirs. The twenty inch iron aqueduct laid between the two large impounding reservoirs is mainly for bringing the surplus waters from the easterly to the westerly (or new) reservoir, or they may be turned into the distributing reservoirs. As the works were virtually finished on the 9th inst., the teams and most of the men which have been connected with the summer's labor were dismissed.

It may be here added also that about four miles of distributing mains have been laid in the city this year, and probably two miles more will be buried before winter, thus aggregating not less than fifty miles of pipes for distribution.

T. H.

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